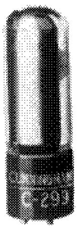
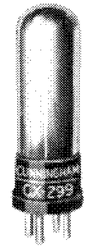
Cunningham RADIO TUBES

C-299 AND CX-299





DETECTORS, AMPLIFIERS

The '99 types are three-electrode, general purpose tubes designed for dry-cell operation. The low power consumption of these tubes makes them applicable to portable receivers and services where power economy is important. The two types have different bases.

CHARACTERISTICS

Filament Voltage (D. C.)	3.0-3.3	Volts
Filament Current	0.060-0.063	Ampere
Plate Voltage	90 *max.*	Volts
Grid Voltage	−4.5	Volts
Plate Current	2.5	Milliamperes
Plate Resistance	15500	Ohms
Amplification Factor	6.6	
Mutual Conductance	425	Micromhos
Grid-Plate Capacitance	3.3	μμf.
Grid-Filament Capacitance	2.5	μμf.
Plate-Filament Capacitance	2.5	μμf.

	Type '99	*X-Type '99*
Maximum Overall Length	3½"	4⅛"
Maximum Diameter	1$\frac{1}{16}$"	1$\frac{3}{16}$"
Bulb (See Figs. on page 42)	T-8 (Fig. 3)	T-8 (Fig. 1)
Base	Small 4-Nub	Small 4-Pin

INSTALLATION

The **base** pins of the X-Type '99 fit the standard four-contact socket while the '99 fits only the small shell socket with bayonet slot. The socket should be installed so that the tubes will operate in a vertical position. Cushioning of the socket in the detector stage may be desirable if microphonic disturbances are encountered. For socket connections of X-Type '99 and of '99, see page 39, Fig. 1 and Fig. 10, respectively.

The **filaments** in these tubes are designed for operation with three No. 6 dry-cells connected in series. In multi-tube receivers the use of six or nine No. 6 dry-cells connected in series-parallel to give 4.5 volts will decrease the current drain per cell and give a more stable source of filament power. If storage-battery operation is preferred, a four-volt storage battery may be used. In any case, a filament rheostat should be provided so that the filament voltage can be adjusted to the recommended operating value.

APPLICATION

As **detectors,** '99's may be operated either with grid leak and condenser or with grid bias. The recommended plate voltage for the former method is 45 volts. A grid leak of from 1 to 5 megohms used with a grid condenser of 0.00025 μf. is satisfactory. The grid circuit return should be connected to the positive filament terminal. For grid bias detection the maximum plate voltage of 90 volts may be used with the corresponding negative grid bias of 10.5 volts. The grid bias should be adjusted so that the plate current is 0.2 milliampere with no a-c input signal.

As **amplifiers,** '99's are applicable to the audio- or the radio-frequency stages of a receiver. Recommended plate and grid voltages are shown under Characteristics.